(12) UK Patent Application (19) GB (11) 2 244 312 (13) A

(43) Date of A publication 27.11.1991

(21) Application No 9111096.5

(22) Date of filing 23.05.1991

(30) Priority data
(31) 4016776 (32) 25.05.1990 (33) DE

(71) Applicant
MTU Motoren-Und Turbinen-Union Friedrichshafen GmbH

(Incorporated in the Federal Republic of Germany)

Olgastrasse 75, Postfach 20-40, D-7990 Friedrichshafen 1, Federal Republic of Germany

(72) Inventor
Hans Sudmanns

(74) Agent and/or Address for Service
Boult Wade & Tennant
27 Furnival Street, London, EC4A 1PQ, United Kingdom

(51) INT CL[5]
F04D 27/00, F02B 37/12, F04D 25/00

(52) UK CL (Edition K)
F1C CBE CBF CD C114 C204 C505 C517 C521 C522 C602
F1B BBD BB120 BB140
F1G GPG
U1S S1994

(56) Documents cited
GB 2179401 A GB 1343246 A GB 0576241 A
GB 0540496 A DE 3932721 C

(58) Field of search
UK CL (Edition K) F1C CBA CBB CBC CBD CBE CBF CD
INT CL[5] F04D 25/00 25/02 25/04 25/16 27/00
Online databases : WPI.

(54) Turbocharging assembly with controllable air-charge compressors for an internal-combustion engine

(57) Air-change compressors (16, 17) are in permanent driving connection with an exhaust-driven turbine (15) which cannot be cut out during operating periods of the internal-combustion engine. The control of the operating condition (no-load delivery or delivery operation) of each air-charge compressor (16, 17) is effected by a change-over device (20) controlling the pressure connection. To improve the efficiency of the turbocharging assembly (12) the power absorption of whichever air-charge compressor (16, 17) has just been adjusted to no-load delivery is minimised by controlling the fluid mass throughput of (for example) "recirculated" air or turbine exhaust gas (eg. Figs. 3, 4) through that compressor. Devices (29, 30) of the compressors (16, 17) enable the direction of air flow to the rotors to be controlled to impart one of counter-swirl, no-swirl or co-swirl to the air entering the rotor.

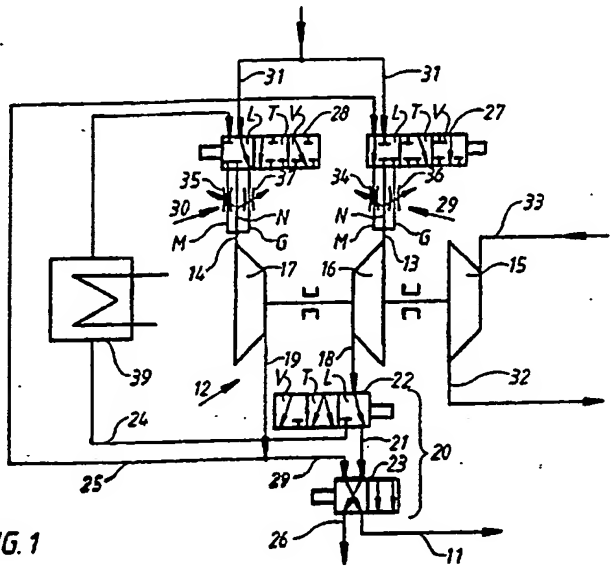

FIG. 1

GB 2 244 312 A

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/US 03/25029

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP 2001355453 A	26-12-2001	NONE	
GB 2244312 A	27-11-1991	DE 4016776 A1	17-10-1991
		FR 2660695 A1	11-10-1991
		IT 1256997 B	27-12-1995
		US 5157924 A	27-10-1992
GB 2163483 A	26-02-1986	NONE	
US 5355677 A	18-10-1994	US 5269144 A	14-12-1993
		AU 659874 B2	01-06-1995
		AU 2591392 A	05-04-1993
		BR 9206478 A	31-10-1995
		CA 2115072 A1	18-03-1993
		EP 0604524 A1	06-07-1994
		JP 2633988 B2	23-07-1997
		JP 6510584 T	24-11-1994
		KR 9701460 B1	06-02-1997
		WO 9305289 A2	18-03-1993
US 4394812 A	26-07-1983	DE 3011203 A1	01-10-1981
		FR 2478737 A1	25-09-1981
		GB 2072747 A ,B	07-10-1981
		IT 1139023 B	17-09-1986
		SE 454617 B	16-05-1988
		SE 8101787 A	23-09-1981
JP 60201025 3 A		NONE	
DE 4118265 A	19-12-1991	DE 4118265 A1	19-12-1991

TURBOCHARGING ASSEMBLY WITH CONTROLLABLE AIR-CHARGER COMPRESSORS FOR AN INTERNAL-COMBUSTION ENGINE

The invention relates to a turbocharging assembly with controllable air-charge compressors for an internal-combustion engine, the air-charge compressors being in driving connection with an exhaust-driven turbine which cannot be cut out during operating periods of the internal-combustion engine, the operating condition (no-load delivery or delivery operation) of each air-charge compressor being determined by a change-over device controlling the pressure connection.

When a forced-induction internal-combustion engine is operating under partial-load and at lower than optimum speed of rotation it is advantageous to adjust the trubocharging assembly to the reduced output of exhaust-gas energy and to optimise the air-charge supply.

DE-C-3 932 721 discloses a turbocharging assembly of the type in question, in which the adjustment of the air-charge supply to the operating condition of the internal-combustion engine is effected by cutting in and out one of the two air-charge compressors operating in parallel.

Although the air-charge compressor to be cut out but entrained is connected to the common air-intake duct it is, however, adjusted to so-called no-load delivery by opening a venting outlet at its pressure connection. At the speed of rotation of the rotor of the turbocharging assembly predetermined by the exhaust-driven turbine and the other air-charge

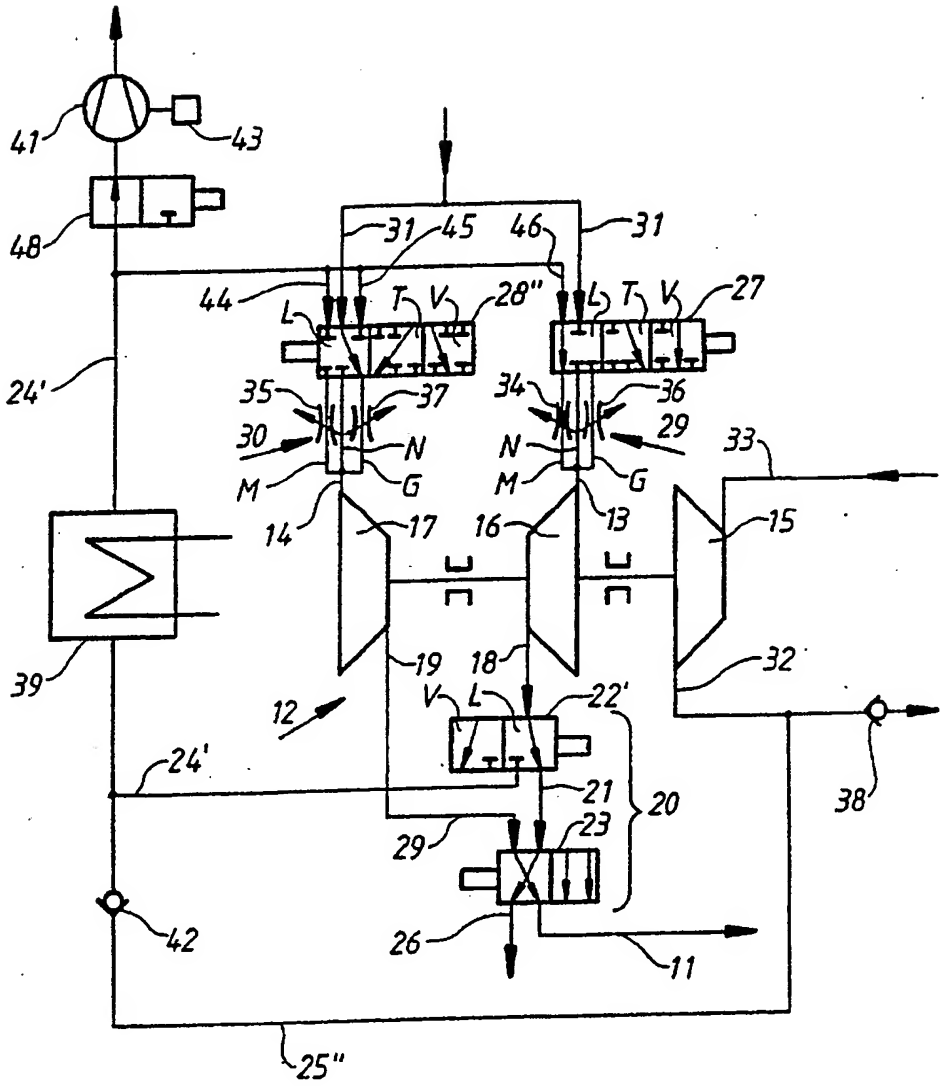

FIG. 4

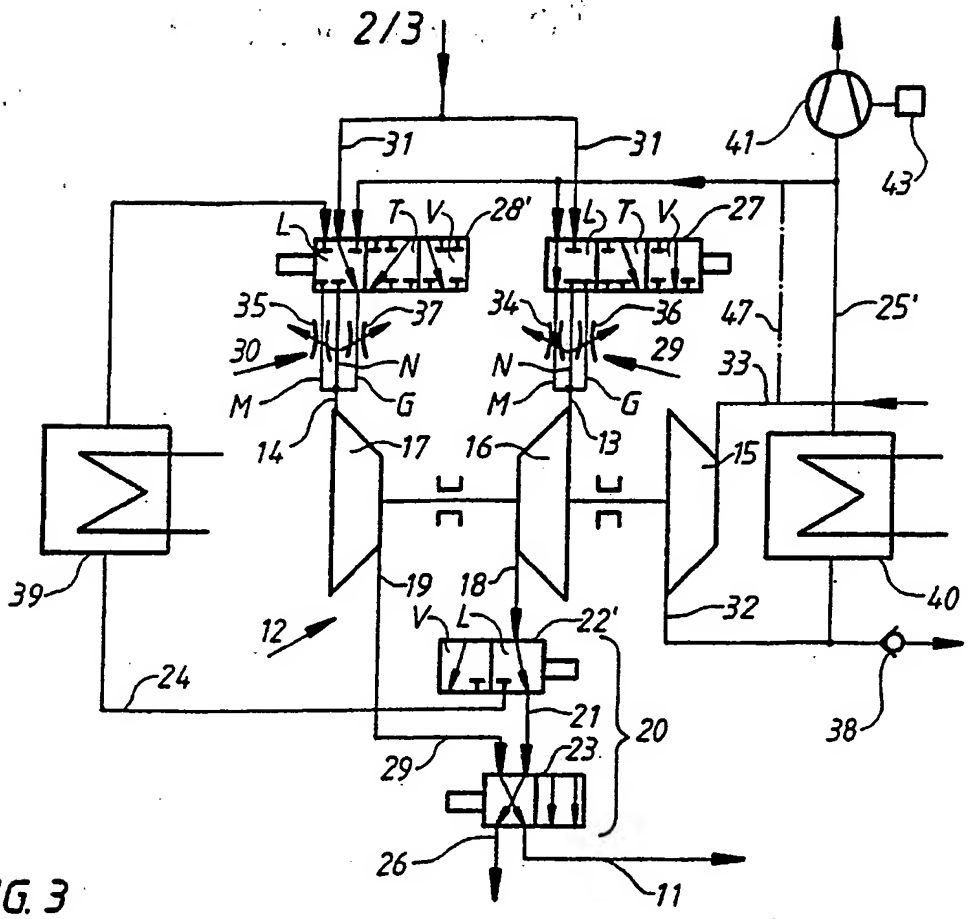

FIG. 3

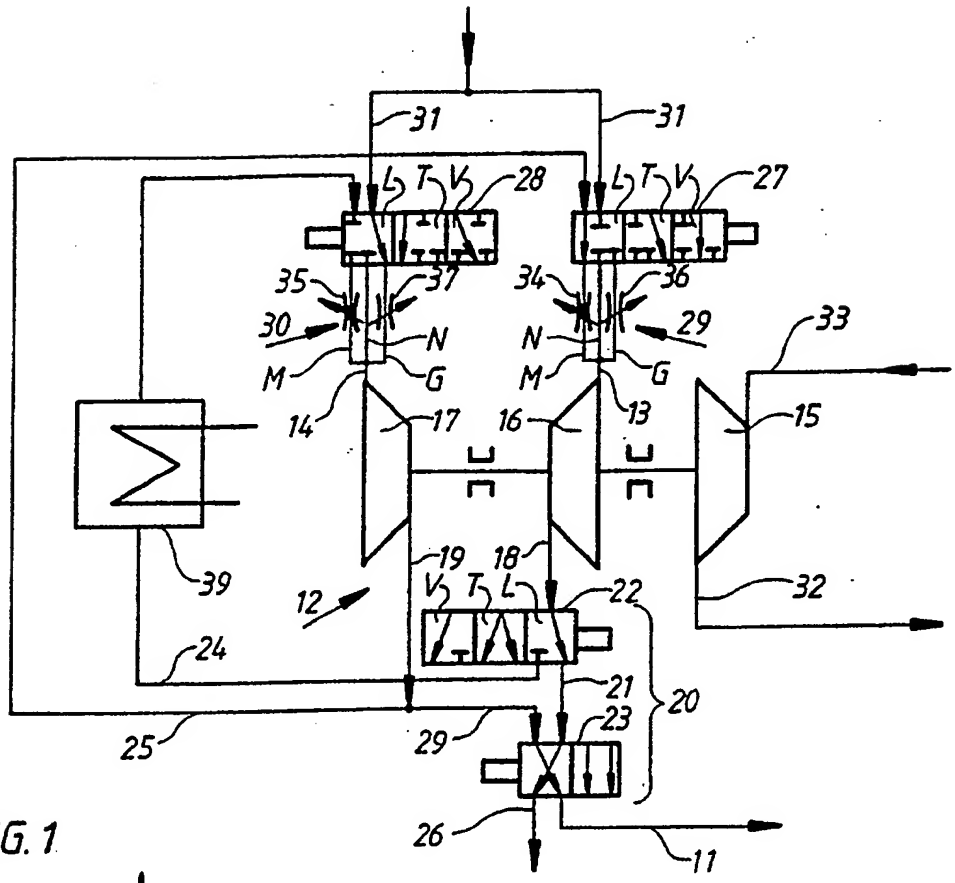

FIG. 1

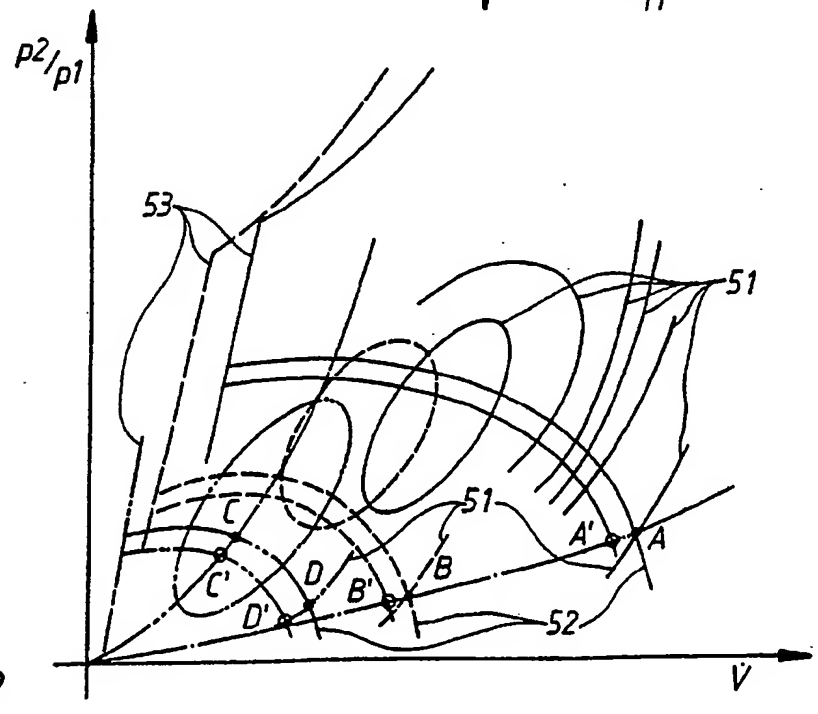

FIG. 2